or *H. Muelleri* in a genus supposed to be distinguished by hygroscopic spores. The retention without comment of the genus Stigmatella (with Sphaerocreas as a synonym!), and the extraordinary disposition of the genus Illosporium, have also been pointed out by Thaxter in a recent number of the GAZETTE, and serve still further to enforce our contention that work of this kind should be left to the skilled monographer, and can otherwise only serve to complicate difficulties already sufficiently great, when done in connection with a hastily prepared and local "List."—***

NOTES FOR STUDENTS.

MR. M. A. BRANNON has completed his study of the structure and development of *Grinnellia Americana*.[15] The work was done at Wood's Holl, the author occupying the table of the Missouri Botanical Garden. The chief points developed in the study may be summed up as follows: This alga is distinctly an American marine form, flourishing in quiet waters. There are no distinct differences in the vegetative structure of the different fronds, which separate from their holdfasts late in summer, and rising to the surface effect a wide distribution of the fruiting bodies. The cells are nucleated and are connected by protoplasmic pits, except the cells of the procarp, which are connected by open pores. Adult plants are very sensitive to intense light and increase of temperature, but will not grow in shady places. Mutilated plants show great powers of proliferation. The carpospores and tetraspores are very favorable for the study of germination, for while they respond readily to external conditions they are hardy enough to allow a wide range of treatment. The non-motile antherozoids are developed in great numbers by the abstriction of the terminal portion of the apical cells of the antheridia. The cystocarp begins to develop by the modification and apical growth of a joint-thallus-cell. The procarp consists of three cells, and is developed from the supporting thallus-cell in the base of the young cystocarp, and its apical cell becomes the carpogonium. The fertilized contents of the carpogonium are transferred through the open pores connecting the procarpic cells to the supporting thallus-cell, which becomes the central one of the five auxiliary cells. The trichogyne is often branched, and fusion of the antherozoid with it results in great stimulation to the thallus-cell at the base of the procarp, the trichogyne itself being a very evanescent organ. The sporiferous filaments are developed as chains of central cells, from whose branches the carpospores arise acropetally.—J. M. C.

M. PAUL PARMENTIER has published an elaborate paper[16] containing the results of his researches in the anatomy and taxonomy of "Onotheraceæ and

[15] Ann. Bot. 11: 1–28. *Pl. 1–4.* 1897.

[16] Ann. Sci. Nat. Bot. VIII. 3: 65–149. *pl. 1–6.* 1896.

Haloragaceæ." The form of the first family name is accounted for by the claim of the author that "Onothera," not "Œnothera," is the proper form of the generic name. The task set was to discover whether anatomical characters could be of diagnostic use, and if so, to define the families and genera accordingly. We are assured that the researches were "crowned with success." Some of the more interesting conclusions are as follows: the system of crystallization of the calcium oxalate is very constant, and permits the distinct separation of the two families; the structure of the hairs is equal to the crystals in taxonomic value; Ludwigia, possessing the crystals and hairs of both families, is the transition genus (placed by the author in Onotheraceæ as a sub-family); the Haloragaceæ are derived from the Onotheraceæ; Gayophytum and Clarkia are not simply sections of Onothera, and Jussiæa is not a section of Ludwigia; the section Schizocarya of Gaura is worthy of generic rank, and is so placed; anatomical characters serve well to distinguish genera and even specific types of Haloragaceæ, but are not so definite in Onotheraceæ. The author considers further interesting anatomical details for which the paper must be consulted. It will be noted that in the opinion of the author the results do not justify the excessive disintegration of Œnothera to which some of us have been inclined.—J. M. C.

In a paper on teratology[17] M. Casimir De Candolle reaches the following conclusions: If the teratological variations of the floral organs have played a part in evolution, those which have resulted in the present complex forms are today the most rare; and also those monstrosities which are at present the most common indicate, so far as phanerogams are concerned, a tendency to a primitive simplicity of form. Consequently, if the progressive taxonomic monstrosities of the flower were not formerly more frequent and especially more varied than they are at present, they would not have been able to produce, through natural selection alone, that evolution which is thought to have resulted in the complex floral structures of the present day. By progressive variations, M. De Candolle means those which have taken a part in evolutionary progress.—J. M. C.

The structure of the Cyanophyceæ and Bacteria has recently been investigated by Professor Dr. Alfred Fischer.[18] He concludes that in neither of these groups is there a nucleus or any organ resembling a nucleus, but the green rind of the Cyanophyceæ is to be regarded as a genuine chromatophore. It will be remembered that Hegler makes the statement that the so-called "central body" of the Cyanophyceæ is a genuine nucleus which divides by karyokinesis.—C. J. C.

[17] Archives des Sci. Phys. et Nat. IV. 3: [1–12]. 1897.

[18] Untersuchungen über den Bau der Cyanophyceen und Bacterien, *pl. 3*. Gustav Fischer: Jena. *M* 7.

ANOTHER VOLUME of the *Minnesota Botanical Studies* was issued May 31, forming Bulletin no. 9 of the Geological and Natural History Survey of Minnesota. The bulky volume of 341 (703–1043) pages and forty-two plates shows an unusual amount of botanical activity, containing nine papers as follows: Contributions to a knowledge of the lichens of Minnesota, II, by Bruce Fink (pp. 703–725). A rearrangement of the North American Hyphomycetes, by Roscoe Pound and Frederic E. Clements (pp. 726–738). On some mosses at high altitudes, by J. M. Holzinger (pp. 739–742). The forces determining the position of dorsiventral leaves, by R. N. Day (pp. 743–752). On the genus Coscinodon in Minnesota, by J. M. Holzinger (pp. 753–759). Observations on the fern and flowering plants of the Hawaiian Islands, by A. A. Heller (pp. 760–922). The phenomena of symbiosis, by Albert Schneider (pp. 923–948). Observations on the distribution of plants along shore at Lake of the Woods, by Conway MacMillan (pp. 949–1023). The alkaloids of Veratrum, by George R. Frankforter (pp. 1024–1043). The ecological paper by Professor MacMillan is especially noteworthy, since it is the first of its kind published in America. His main results were presented before the Botanical Society of America at its meeting last summer, and were summarized in the GAZETTE of last September. The paper should be a stimulus to many students who ought to turn their attention to this very important field of observation, dealing as it does with the great mass problems of vegetation in relation to environment. It is a kind of work especially adapted to the isolated worker who has no good laboratory and library facilities, and who wishes to do something more than to "collect." Besides, it is the great coming field of botanical activity in America, destined to set aside somewhat the physiological work which has begun to become sterile through its mechanical development in the direction of small and secondary problems.—J. M. C.

MR. C. B. DAVENPORT[19] has been studying the rôle of water in growth. In his paper he first considers the definition of growth in organisms, next analyzes the processes of growth, then shows what an important part water plays in the growth and the significance of this fact for the developmental process in general, and finally discusses the bearing of the new facts upon previously formulated laws of growth. His conclusions are summarized as follows: He recognizes a general parallelism between the developmental processes occurring at the tip of a twig and in the animal embryo. In both there is first a period of rapid cell division with slow growth; next, a grand period in which the general form of the embryo is acquired, the *Anlagen* of the organs are established, and the organism increases rapidly in size by imbibition of water; and, lastly, a period in which histological differentiation is carried on while the absolute growth increments cease to increase. Finally,

[19] Proc. Boston Soc. Nat. Hist. **28**: 73–84. 1897.

the fact that increase in body substance is so largely due to a non-growing substance — water — diminishes the value of the percentage increment curve of growth.—J. M. C.

DR. BRADLEY M. DAVIS[20] has published an interesting account of the vegetation of the hot springs of Yellowstone Park. He finds that many of the peculiar forms of deposit in and about the springs have been determined by the presence of certain algæ. The manner in which these algæ have determined the "columns and moldings" is described in a convincing way. The subject thus opened up is one of great interest, and suggests further research into the conditions of growth in these hot waters. The paper is not a technical presentation of the subject, as the algæ forms concerned have not been sufficiently studied, but it presents the most obvious effects of their presence.—J. M. C.

THE QUESTION of the nomenclature of the North American species of Leucobryum does not seem to be fully settled yet in spite of Mrs. Britton's careful study in the *Bull. Torr. Bot. Club* **19**: 189. 1892. In the *Journal de Botanique* for March 16th, M. Émile Bescherelle discusses the matter and concludes that the following is the correct synonymy:

LEUCOBRYUM MINUS (Dill). Sull.

Bryum albidum et glaucum, fragile, minus Dillen, Spec. Musc. Appendix 546. *pl. 83*. 1741.

Dicranum albidum Bridel, Musc. Recent. 167. 1798.–Spec. Musc. 205. 1806.

Dicranum glaucum var. *albidum* Weber et Mohr, Bot. Tasch. 166. 1807.–Bridel, Bry. Univ. **1**: 409. 1826.

Leucobryum vulgare Hampe var. *minus* C. Müller, Linnæa **18**: 687. 1844.–Synop. Musc. **1**: 75. 1849.

Leucobryum minus Hampe MS. in Sull. Moss. of U. S. 24. 1856.

Leucobryum albidum (Brid). Lindberg, Mossor. Synon. 21. 1863.

Leucobryum minus Hampe *fide* Lindberg in Mossorna uti Dillenii Historia Muscorum 35. 1883.

Leucobryum minus Sullivant in Lesq. et James, Man. Moss. N. Am. 91. 1884.

DISTRIBUTION: Europe: N. America — Ohio (*Sull.* no. 77, 98); Penn. (*Torrey fide* Britton); Central America; Mexico (*Galeotti* no. 6871).

LEUCOBRYUM MINUS (Dill.) Sull. *forma* PUMILA Besch.

Bryum (*Dicranum?*) *minus*, f, *pumilum* Michaux in Herb. Mus. Paris.

Dicranum glaucum: pumilum Michaux, Flora Bor. Am. **2**:— 1803.

Leucobryum vulgare var. *minus* Hampe, Linnæa **13**: 42. 1839 *fide* Mrs. Britton.

Leucobryum sediforme Lesq. et James, Man. Mosses N. Amer. 91. 1884 *fide* Mrs. Britton.

Leucobryum pumilum (Michx.) Britton, Bull. Torr. Bot. Club **19**: 189. 1892.

DISTRIBUTION: N. America — Carolina (*Michaux*); Alleghany mts.

[20] Science **6**: 145–157. 1897.

(*Sullivant* no. 169); Appalachian mts. (*Austin* no. 477 *fide* Mrs. Britton); Florida (*Donnell Smith*, Dec. 1897); Monticello (*Lightpipe*).

LEUCOBRYUM MINUS (Dill). Sull. *forma* INTERMEDIA Besch.

DISTRIBUTION: N. America—Ohio (*Sullivant* nos. 77, 98); S. Carolina (*Ravenel*); Florida (*Durand*).—C. R. B.

PERHAPS THE MOST IMPORTANT recent work in plant geography is that by Johow on Juan Fernandez, undertaken under the auspices of the Chilean government.[21] Juan Fernandez consists of two large islands (Masatierra and Masafuera) and a small rocky island (Santa Clara), several hundred miles west of Chile. The islands are volcanic in origin, dating back no further than the tertiary, and were never connected with the main land. There are steep mountains ascending up to 1800 meters and cut by deep valleys. The author makes an evolutionary analysis of the flora, concluding that the flora has been derived from the mainland, and mostly from Chile. Oceanic and continental islands are contrasted and Juan Fernandez is considered to be an oceanic island, a conclusion in harmony with the absence of land mammals and reptiles. As in most remote islands, there is a small number of species distributed in a relatively large number of genera and orders (143 species of ferns and seed plants in 87 genera and 43 families). The author considers the species, grouping them according to the time of introduction: (*a*) endemic species represent the oldest inhabitants, having diverged most from continental types; 69 endemic species, 12 endemic genera and 1 endemic family are recorded, showing a remarkable degree of endemism, greater than upon any other island group, possibly excepting the Sandwich Islands; (*b*) the autochthones are strikingly similar to Chilean species, 74 species being recorded; their introduction has been brought about by birds, winds and sea currents; (*c*) 71 species were introduced by man unintentionally; (*d*) 24 species have been introduced intentionally and have become naturalized; (*e*) 23 species are strictly culture plants. The plant societies are next discussed as follows, the most important one being (1) the sub-tropical evergreen forest, which extends over half the district. All native trees but one are evergreen, and some introduced trees that are deciduous in their native land have taken on the evergreen habit, *e. g.*, the peach tree. The valley forests are often made up of extensive social growths, while the mountain forests are more mixed. Ferns form an immense part of the vegetation. Many of the plants have large or highly colored flowers, strongly contrasting with the inconspicuous anemophilous flowers of most oceanic islands; the Juan Fernandez species are much more showy than the related Chilean species. Many species are pollinated by humming birds and some by insects. (2) The vegetation of rocky cliffs is

[21] Estudios sobre la flora de las Islas de Juan Fernandez. Obra illustrada con 2 mapas, 8 grabados y 18 láminas—Santiago de Chile, Imprenta Cervantes 1896. 4°. 287 pp. See Eng. Bot. Jahrb. **22**: Heft IV und V, Litteraturbericht, pp. 44–50.

more or less like a steppe, consisting of herbs with scattered shrubs. (3) The strand vegetation is very sparse because of the strong dry winds and scarcity of soil. (4) A very dry stony district characterized by growths of *Avena hirsuta*, (5) Fern steppes. (6) Cultivated areas.

Dusén has written up the results of a Swedish expedition to Terra del Fuego.[22] There are three principal vegetation districts: (1) the northern dry district, largely without forests. There are thickets on small hills near the coast and more or less throughout. There are halophytes on the strand and in saline lagoons, grasses and sedges in the fresh water lagoons. Some portions of the district contain heaths. The woods that occur are almost exclusively of *Fagus antarctica*, with a rather rich herb vegetation, and comparatively few cryptogams. (2) The southern rainy district has extensive forests, the soil being clothed with liverworts, while mosses are comparatively infrequent. Ferns are abundant. Dense thickets occur near the sea. The mountain floras take on something of the aspect of our northern mountain forests, but the coastal flora has a more tropical appearance. (3) The transition district. The introduced plants are successfully combating with the natives. Xerophyte adaptations are seen in the rainy district as well as in the dry area, probably because of the abundance of mists and clouds; the small amount of illumination results in weak assimilation, hence the necessity for protective adaptations. The evergreen habit also facilitates assimilation by extending the period of activity. The crowns of the trees are much spread out horizontally, thus permitting more assimilation.

Sievers in an article on the physical geography of Venezuela considers some of the more striking plant societies of the country.[23] Twelve plant societies are considered: coastal mangrove swamps, strand vegetation, extensive interior grassy fields or savannas, desert steppes of the Llanos, grassy Morichales, xerophilous thickets with an abundance of cacti, transitional dry woods with an abundance of the Mimoseæ, moister tropical Galerie woods, luxuriant tropical rainy woods, mountain woods with tree ferns, cinchonas and orchids, mountain meadows with an abundance of grasses and perennial herbs, and the Paramos. Vegetation ascends to the snow line because of the moist climate —H. C. C.

ITEMS OF TAXONOMIC INTEREST are as follows: Dr. John K. Small[24] has published an account of the sessile flowered trilliums of the southern states recognizing six species, one of which is described as new, and named for Dr. Underwood. Mr. P. A. Rydberg[25] has begun a description of rarities from Montana, the first three papers containing several new species. Mr. Geo. V.

[22] Botaniska Notiser Hef 6, 1896. See Bot. Cent. Bei. **6**: 519–522.

[23] Petermann's Mittheilungen **42**: 197–201. 1896.

[24] Bull. Torr. Bot. Club **24**: 169–175. 1897.

[25] Op. cit. **24**: 188–192, 243–253, 292–299. 1897.

Nash[26] has described recently several new species of Panicum. Mr. Marshall A. Howe[27] has described a new Californian liverwort, to which he has given the generic name *Gyrothyra*. In its sterile condition it is said to resemble certain forms of Nardia. The type species is dedicated to Dr. Underwood. Dr. John K. Small[28] has published a revision of the species of Tradescantia in the southern states, recognizing eleven species, four of which are proposed as new. Miss Anna Murray Vail[29] has begun a series of papers upon Asclepiadaceæ, in the first number discussing the genus Philibertella, called Philibertia by Dr. Gray. Mr. F. V. Coville,[30] in discussing the name of the camas plant, has given the citations and synonymy of the genus Quamassia, and a synopsis of the species, five of which are recognized. It seems that our eastern *Camassia Fraseri* becomes *Q. esculenta*, while the real camas of the west is *Q. quamash*. Two more new plants from Mount Mazama, Oregon, have been described by Messrs. Coville and Leiberg,[31] being species of Arenaria and Cardamine. Mr. M. L. Fernald[32] has published a second supplement to the Portland catalogue of Maine plants. The recent pages of *Pittonia* which have reached us extend from 159–182. They contain the usual descriptions of new species and discussions of old forms. Chief attention, however, is given to the Compositae, the genus Erigeron being made larger by eight species, the genus Antennaria increased by six species, and the genus Mesadenia of Rafinesque taken up for our species of Cacalia, which genus is thus restricted to African and East Indian forms. Mr. W. N. Suksdorf,[33] in presenting the genus Plectritis and its allies, describes several new species, and proposes the new genus *Aligera*, founded upon *Plectritis macrocera* T. & G. In addition to this species the *Valerianella ciliosa* of Greene is included, and seven new species are described. Mr. J. M. Greenman[34] has prepared a revision of Mexican and Central American species of Houstonia, recognizing twenty-three species, several of which are new. He has also prepared a key to the Mexican species of Liabum. Among the numerous new species from Mexico he has proposed two new genera, *Streptotrachelus* [Apocynaceæ] and *Buceragenia* [Acanthaceæ]. Mr. F. Lamson-Scribner,[35] in his "Studies of American grasses," intends to present certain new and little known species which have been brought to his attention in connection with his preparation

[26] Op. cit. **24**: 192–201. 1897.
[27] Op. cit. **24**: 201–205. 1897.
[28] Op. cit. **24**: 228–236. 1897.
[29] Op. cit. **24**: 305–310. 1897.
[30] Proc. Biol. Soc. Washington **11**: 61–65. 1897.
[31] Op. cit. **11**: 169–171. 1897.
[32] Proc. Portland Soc. Nat. Hist. **2**: 123–137. 1897.
[33] Deutsche bot. Monatsschrift —: 1–4, 143–148. 1897.
[34] Proc. Amer. Acad. **32**: 283–311. 1897.
[35] Bulletin 8, U. S. Depart. Agric. pp. 20. *pl.* 8. 1897.

of the proposed handbook of North American grasses. The present paper includes nine such species. In the same publication Miss E. L. Ogden describes and figures the leaf structure of *Jouvea* and of *Eragrostis obtusiflora*. *Robinsonella* is a new genus of tree mallows described and figured by J. N. Rose and E. G. Baker.[36] In the collections of Messrs. E. W. Nelson and C. G. Pringle and Captain John Donnell-Smith two undescribed species were discovered, which, with an anomalous one described under Sida, are taken to constitute the new generic type. The genus is composed of five species, two of which are Mexican, one Central American, and two South American, but only three species appear in the present paper. The genus is dedicated to Dr. B. L. Robinson, Curator of the Gray Herbarium. Professor Sargent[37] describes and figures *Cladothamnus pyrolæfolius*, a woody ericaceous plant which grows in the upland meadows of Alaska. A second species, long confounded with the Alaskan plant, inhabits Washington and British Columbia, and has been described by Professor Greene as *C. campanulatus*. The folio of *Pittonia* issued July 20[38] completes Part 16. Among descriptions of new species there are "corrections in nomenclature," among which *Atamosco* is is made to replace *Zephyranthes;* and a discussion of certain "ranunculaceous monotypes," *Kumlienia* (*R. hystriculus*), *Arcteranthis* (*R. Cooleyæ*), and *Cyrtorhyncha* (*R. Nuttallii*). A new Antennaria from New England has been described by M. L. Fernald.[39] Dr. Carl Müller has just published[40] descriptions of fifty new species of Jamaican mosses. In a recent number of Engler's *Jahrbücher*[41] the studies of African plants are continued, Schumann completing the Rubiaceæ, proposing four new genera (*Probletostemon*, *Heinsenia*, *Paragophyta*, *Baumannia*); Diels and Engler present the Scrophulariaceæ, the latter proposing four new genera (*Zenkerina*, *Gerardiina*, *Thumbergianthus*, *Strigina*); Pax makes his third contribution to the Euphorbiaceæ; and Hennings presents a second paper on the fungi. In the same journal, of later date,[42] Schumann discusses Phyllocactus and Epiphyllum; Urban presents a fourth fascicle of "Additions to the West Indian flora," which consists of complete lists, with keys to the larger genera, of the great groups Loranthaceæ, and pteridophytes; and Dietel and Niger publish a second contribution upon the Uredineæ of Chili. Hans Hallier[43] has begun a series of notes preparatory to a "monograph of Convolvulaceæ," the first paper being a discussion of nomenclature, and notes on various species.

[36] Garden and Forest **10**: 224–247. 1897.
[37] Garden and Forest **10**: 215–216. 1897.
[38] Pittonia **3**: 183–198 1897.
[39] Garden and Forest **10**: 284. 1897.
[40] Bull. L'Herb. Boiss. **5**: 547–567. 1897.
[41] Bot. Jarbach. **23**: 449–560. 1897.
[42] Op. cit. **24**: 1–160. 1897.
[43] Bull. L'Herb. Boiss. **5**: 366–387. 1897.

Among them is a section dealing with American forms, two of which are described as new. In the same journal,[44] in connection with studies of lake biology, Chodat publishes much taxonomic material dealing with the algæ of certain French and Swiss lakes, two new genera (*Sphærocystis* and *Stichoglæoa*) being proposed. *Gooringia* is the name of a new genus of Caryophyllaceæ (Alsineæ) from central Tibet, described by F. N. Williams.[45] G. Lindau[46] has published descriptions of new or little known American and Asiatic Acanthaceæ. The American forms are mainly South American, and include six new genera: *Orophochilus* (Peru), *Rhombochlamys* (two species from Columbia), *Psilanthele* (Ecuador), *Megaskepasma* (Venezuela), *Rhacodiscus* (Brazil), *Cylindrosolenium* (Peru). *Tetramerium aureum* Rose is made *Justicia* (*Dianthera*) *aurea* (Rose) Lindau; and *Carlowrightia* (?) *Pringlei* Rob. & Greenm. is said to be *Siphonoglossa Pringlei* (Rob. & Greenm.) Lindau. C. DeCandolle[47] has published an account of the Piperaceæ collected by M. Edouard André in the northern states of South America. *Hicoria pallida* is discussed and figured in *Garden and Forest*.[48]—J. M. C.

[44] Bull. L'Herb. Boiss. **5**: 289–314. 1897.
[45] Op. cit. **5**: 530–531. 1897.
[46] Op. cit. **5**: 643–681. 1897.
[47] Op. cit. **5**: 696–711. 1897.
[48] Op. cit. **10**: 304–306. 1897.